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ABSTRACT

The predictive validity of the Slosson Intelligence Test, Peabody Picture Vocabulary Test, Goodenough-Harris Drawing Test, Developmental Test of Visual Motor Integration, and the Metropolitan Readiness Test was evaluated for use with kindergarten children. The criterion measure was the California Achievement Tests administered when the children were in second grade. The 81 public school kindergarten children were administered both the screening measures and the California Achievement test. The screening measures were originally administered to 123 children in six kindergarten classes; 81 of these children were located two years later. Examination of the correlations between the screening measures and achievement measures revealed that only the Metropolitan Readiness Test was related to the achievement measures. Stepwise regression results revealed that only the Metropolitan Readiness Test was entered into any of the achievement equations. It is recommended that remedial programs basing their treatment on diagnostic data from screening batteries be certain that test scores are actually related to future achievement. If not, the teacher would be better advised to use his or her own observations and interactions with the child to devise a treatment program. (Author/CTM)

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Predicting Second Grade Achievement Scores with the Slosson Intelligence Test, Peabody Picture Vocabulary Test, Goodenough-Harris Drawing Test, Developmental Test of Visual Motor and the Metropolitan Readiness Test

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ABSTRACT

The predictive validity of the Slosson Intelligence Test, Peabody Picture Vocabulary Test, Goodenough-Harris Drawing Test, Developmental Test of Visual Motor Integration, and the Metropolitan Readiness Test was evaluated for use with kindergarten children.

The criterion measure was the California Achievement Tests administered when the children were in second grade. The 81 children administered both the screening measures and the California Achievement test were attending a public school kindergarten. The screening measures were originally administered to 123 children in six kindergarten classes.

Examination of the correlations between the screening measures and achievement measures revealed that on the Metropolitan was related to the achievement measures. Stepwise regression results revealed that only the Metropolitan was entered into any of the achievement equations.

Predicting Second Grade Achievement Scores with the Slosson Intelligence Test, Peabody Picture Vocabulary Test, Goodenough-Harris Drawing Test, Developmental Test of Visual Motor and the Metropolitan Readiness Test

Kindergarten screening is a routine practice in many school districts. The rationale for the screening is that an identification of kindergarten children with perceptual or intellectual impairment before they have suffered the trauma of school failure will allow for the remediation of these impairments. A number of assessment and testing procedures have been recommended for or developed to deliniate areas of functioning and malfunctioning in perception, intellectual performance, and communication abilities (Frostig, Lefever, and Whittlesey, 1961; Ayres, 1962, Money, 1962; Silver and Hagin, 1964). Specific approaches have been programmed to develop abilities and remediate inadequacies (Frostig and Horne, 1964; Llorens, Rubin, Braur, Beck, Mottley, and Beall, 1964; Silver and Hagin, 1965).

Haring and Ridgway (1967) state that once a teacher recognized a child as having learning difficulties that she can construct an appropriate instructional program. Thus, if the kindergarten teacher could identify the child with potential learning problems, they could be remediated and thereby eliminate future problems. Unfortunately, there is little support for either the contentions that accurate diagnosis of future learning difficulties is possible, or that once diagnosed that there are effective remediation procedures available. (Mann and Phillips, 1967).

The child is an information processing system that must record, analyze and transmit data. The efforts of Frostig, Kephart, Kirk, and others have greatly increased our understanding of the development of visual, auditory, and motor function in the young. While these functions have sometimes been dealt with independently, it is necessary in performing school tasks that these basic functions

work together. Advocates of the assessment of specific abilities (Bateman, 1964; Gallagher, 1964; Stevens, 1965; Lindsley, 1965) appear to be preceding as if this assumption were fully demonstrated and having operational viability. Proponent of the assessment of specific abilities can point out legitimately that their techniques have been demonstrated to differentiate different types of handicaps one from the other and in comparison with normal groups (Sievers, McCarthy, Olson, Bateman, and Kass, 1963). However, their validation efforts are of concurrent validity variety, the limitations of which are well discussed by Yates (1966). The present study is of a predictive nature. Do the instruments studies predict the child's school adjustment after two years of school? This question must be answered before remediation procedures are devised to avoid possible school difficulties.

An example of most evaluations of screening programs is a study presently underway in Glenview, Illinois Public Schools to identify children with learning disabilities or concomitant problems (Planz, 1972). The screening program being implemented consists of a gross screening of those children who score below predetermined criteria. From that a profile of each child is then developed. The results of the screening are then shared with kindergarten teachers, first grade teachers, and parents in order to plan an educational program to meet the child's particular needs. The evaluation of this screening program will be complex since it will be impossible to differentiate whether weaknesses in the program are due to the measurement devices or due to the remediation procedures used. The present study is in contrast to the Glenview screening program in that it is concerned with validating the instruments used before attempting validation studies of any remediational procedures.

Screening Instruments Method

The following five measures were selected for evaluation because they are widely used screening measures for kindergarten children.

1. Slosson Intelligence Test (SIT) (Slosson, 1963). The purpose of the SIT was the development of an intelligence test for both children and adults that could be administered in a relatively short amount of time. The SIT tasks are modeled after those on the Stanford-Binet Intelligence Scale, form L-M, and the Gesell Development Schedules. Comparisons between the Stanford-Binet and SIT indicate that at all age levels, the validity coefficients are better than .9 and both tests furnish nearly identical means and standard deviations (Slosson, 1963). The SIT does not have subtests; instead, its questions or tasks require more complex and difficult processes with each consecutive age level. The subject is not asked every item; he is started approximately one year below his chronological age and stopped after a certain number of questions are missed.

2. Peabody Picture Vocabulary Test (PPVT) (Lloyd M. Dunn, 1959). The purpose of the Peabody Picture Vocabulary Test is to measure verbal intelligence through evaluating the subject's auditory receptive vocabulary. The reliability of the PPVT, when used with the random population of children, was from .67 to .84 with a mean of .77. The PPVT consists of 150 plates, each of which contains four pictures clearly illustrated by dark, clear-lined drawings. The examiner says a word describing one of the pictures and the subject only has to point to it or tell the picture number. The standardization population was based on 4,012 white children in and around Nashville, Tennessee.

3. Goodenough-Harris Drawing Test (Harris, 1963). Harris designed his Drawing Test as a measure of intellectual maturity. The test is a revision of the 1926 Draw-A-Man Test designed for personality assessment by Goodenough (1926).

The test is constructed for five- through ten-year-old children. The child is asked to draw a picture (the best he can) of a man, a woman, and, optionally, himself. The points received in the drawings are converted to a mean of 100 and a standard deviation of 15. The two (or three) drawings are scored on various drawing inclusions such as body features, clothing, perspective, and proportion.

The standardization population included 2,975 children ranging in age from 5 to 15 years, chosen to represent the population of the United States. The test appears to be highly reliable with below-average-intelligence children, moderately reliable with average-intelligence children, and fairly (.60 - .70) reliable in use with above-average-intelligence children (Harris, 1963).

4. Developmental Test of Visual Motor Integration (VMI) (Beery, 1967). The VMI consists of 24 geometric forms that are to be copied in a test booklet. These geometric forms are arranged in order of increasing difficulty. The score is calculated as the number of forms that have been copied successfully prior to three consecutive failures. A separate age equivalent norm for each sex is also provided for each of the 24 items on the test. A correlation of .89 between scores on the VMI and chronological age is the only validity information available in the manual. An internal consistency reliability of .93 was computed for an unknown portion of the standardization population consisting of 594 children from suburban schools. Test-retest reliability over two week period, obtained for another portion of the standardization population consisting of 171 children from rural schools was .83 for boys and .87 for girls.

5. Metropolitan Readiness Test (MRT) (Hildreth, Griffiths, and McGauvran, 1969). The MRT is designed to measure readiness for first grade instruction and to provide teachers with information helpful in classifying pupils. The assumption underlying all of the MRT is that present level of performance, based upon interaction of maturation and post learning, is the best predictor of future achievement.

The MRT manual presents considerable data on the predictive validty of the MRT for reading attainment as assessed by the reading section of the Stanford Achievement Test. Forms A and B possess low alternative form reliability for the subtest (.50 to .86) which support the warning in the manual to avoid attaching any significance to the subtest scores. The alternate form reliability of .91 for total test is high enough for use with individual pupils.

Dependent Variable

The California Achievement Tests (Tiegs and Clark, 1970) provides normative evaluations of reading, arithmetic, and language achievement in the grade range of 1-14. The 1970 edition of the tests are based on model-age groups (18 months age range per grade) drawn from a stratified national sample of 15,35 pupil. The reported reliabilities for the total reading, total arithmetic, and total language scores fall in the range of .86 to .96. Validity data are given in the 1957 Technical Report in terms of correlations with other test scores, item analysis statistics, and other criteria. The California Achievement Test has one form and five levels. The test was designed to focus on the traditional fundamental skills and content in the areas of reading (vocabulary and comprehension) mathematics (computation concepts and problems and total, language mechanics, usage and structure, total, spelling and total score).

Procedure

The 81 children administered both the screening measures and California Achievement Test were attending public school kindergarten in a university community of approximately 25,000 population. Of these children, 43 percent were black, which is nearly identical to the percentage of black students (39 percent) in the total grade school system. The sample consisted of 123 children in six kindergarten classes. It was possible to locate 81 of these children two years later.

The school psychologist and teachers administered the Slosson Intelligence Test (SIT), Developmental Test of Visual Motor Integration (VMI), Goodenough-Harris Draw-A-Person (DAP), and Peabody Picture Vocabulary Test (PPVT) in September of the school year. The Metropolitan Readiness Test (MRT) was administered in May by the kindergarten teachers. The school psychologist scored all the September testing while the teachers scored the Metropolitan. After two years the children were administered the California Achievement Tests (CTB) by the child's classroom teacher.

Results

The data was analyzed using the SPSS (Nie, Hull, Jenkin, Steinbrenner, and Bent, 1975) stepwise regression program using the California Achievement Tests subscores and total score. The means and standard deviations for the screening and dependent measures are in Table 1 and the intercorrelations between the variable are in Tables 2, 3, 4, and 5.

Table 1 About Here

Table 2 About Here

Table 3 About Here

Table 4 About Here

Table 5 About Here

Examination of the intercorrelations indicate that only the Metropolitan is significantly related to the CTB total and subtests scores. The only way possible for the other screening measures to be effective predictors in the regression equations constructed was if the variables acted as suppresser variables in suppressing error variance.

The stepwise regression results with the dependent variables being the CTB eading (Y_1), Language (Y_2), Math (Y_3), and Total (Y_4) and the independent variables being the Metropolitan Readiness Test (X_1), SIT (X_3), VMI (X_4), PVT (X_5), and DAP (X_2) are presented in Tables 6, 7, 8, 9, and 10.

Table 6 About Here

Table 7 About Here

Table 8 About Here

Table 9 About Here

Table 10 About Here

The examination of the stepwise regression results revealed that no significant suppressor effect was found by using the screening measures together in predicting language, reading, math or the total score on the CTB. The findings confirm the results presented in Table 2 that the only effective screening measure is the Metropolitan Readiness Test. However, even this relationship is not strong as only 10 percent of the variance is accounted for in the dependent variable.

Discussion

Predicting school achievement in five year olds is difficult at best. Teachers' evaluations have not been dependable and as the present results indicate that screening test results for the most part have little relationship to the child's future school achievement. Book (1971) and DeHirsch (1966) both suggests the use of a predictive screening battery for the early identification and program planning for children with perceptual, intellectual, and readiness deficits. This recommendation was made despite their similar findings that out of a battery of tests only two (Metropolitan Readiness and Bender-Gestalt) instruments had significant relationships with first and second grade achievement and even this relationship was low. Thus the selection of a valid screening battery is not yet complete and new or refined instruments must be evaluated to determine if they possess predictive validity. This must be accomplished before any attempts to utilize screening data for individual remedial programs can rationally be supported.

The problem of predicting later achievement from kindergarten data may lie in the child, not in the measuring instruments. Children during the five to six year age range are in a state of flux as the differing rates of development demonstrated by children at this age may not have a strong relationship with their later achievement. If this is the case improvements in screening instruments will only result in small improvements in the predictive power of the screening battery. Thus early efforts at remediating deficits in perceptual or other deficits may not be beneficial due to the instability of the deficits. In other words, a child lagging behind in some specific developmental area during kindergarten may not have this lag in second grade. Supporting this contention is the insignificant relationship between the Slosson IQ and the achievement measures. If a general

intelligence test administered during kindergarten has a low relationship with second grade achievement it should not be expected that measures of specific abilities would predict any better.

It is recommended that remedial programs basing their treatment on diagnostic data from screening batteries be certain that test scores are actually related to future achievement. If not the teacher would be better advised to use her own observations and interactions with the child to devise a treatment program.

Table 1

Means and Standard Deviations

for the Screening and Dependent Measures

(N = 81)

	Means	Standard Deviations
Metropolitan Readiness Test	55.36	33.71
Slosson IQ	94.12	37.68
Visual Motor Integration	71.86	37.44
Peabody Vocabulary Test	67.57	54.09
Draw-A-Person	76.52	39.01
California Achievement Test		
Reading	307.36	137.83
Language	317.22	138.12
Math	272.85	132.93
Total	253.94	141.50

Table 2

Intercorrelation of CTB Reading with

Screening Measures (N = 81)

Metropolitan Readiness	1.000					
CTB Reading	.341*	1.000				
SIT	.378*	.136	1.000			
VMI	.317*	.019	.594*	1.000		
PPVT	.124	.004	.322*	.417*	1.000	
DAP	.355*	.101	.605*	.413*	.335*	1.000
	Metropolitan Readiness	CTB Reading	Slosson IQ	VMI	PPVT	DAP

*Significant at .01 level

Table 3

Intercorrelations of CTB Language with

Screening Measures (N = 81)

	Metropolitan Readiness	CTB Language	SIT	VMI	PPVT	DAP
Metropolitan Readiness	1.000					
CTB Language	.315*	1.000				
SIT	.378*	.143	1.000			
VMI	.317*	-.046	.594*	1.000		
PPVT	.124	-.016	.321*	.417*	1.000	
DAP	.354*	.104	.605*	.414*	.335*	1.000

*Significant at .01 level

Table 4

Intercorrelations of CTB Math with

Screening Measures (N = 81)

Metropolitan Readiness	1.000					
CTB Math	.303*	1.000				
SIT	.378*	.137	1.000			
VMI	.317*	.098	.594*	1.000		
PPVT	.124	.061	.322*	.417*	1.000	
DAP	.355*	.120	.605*	.414*	.335*	1.000

	Metropolitan Readiness	CTB Math	SIT	VMI	PPVT	DAP

*Significant at .01 level

Table 5

Intercorrelations of CTB Total with

Screening Measures (N = 81)

Metropolitan Readiness	1.000					
CTB Total	.277*	1.000				
SIT	.378*	.123	1.000			
VMI	.317*	.003	.594*	1.000		
PPVT	.124	.023	.322*	.417*	1.000	
DAP	.355*	.068	.605*	.430*	.335*	1.000
	Metropolitan Readiness	CTB Total	SIT	VMI	PPVT	DAP

*Significant at .01 level

Table 6

Stepwise Regression Equations and Coefficients

for the Four Dependent Variables (N = 81)

Y_1	=	+	.334 X_1	-	.017 X_2	+	.076 X_3	-	247 X_4	-	.005 X_5
Y_2	=	+	.334 X_1	-	.017 X_2	+	.247 X_3	-	.247 X_4	-	.005 X_5
Y_3	=	+	.296 X_1	-	.003 X_2	+	.035 X_3	-	.027 X_4	-	025 X_5
Y_4	=	+	.294 X_1	-	061 X_2	+	.131 X_3	-	.155 X_4	+	.030 X_5

Table 7

Stepwise Regression Results with

CTB Reading as Dependent Variable (N = 81)

Step	Variable	Multiple R	RSQ Change
1	Metropolitan Readiness	.341	.116*
2	Draw-A-Person	.341	.000
3	Slosson IQ	.342	.001
4	Visual Motor Integration	.379	.026
5	Peabody Picture Vocabulary	.379	.000

*Significant at .01 level

Table 8

Stepwise Regression Results with

CTB Language Score as Dependent Variable (N = 81)

Step	Variable	Multiple R	RSQ Change
1	Metropolitan Readiness	.315	.010*
2	Draw-A-Person	.316	.000
3	Slosson IQ	.317	.001
4	Visual Motor Integration	.375	.040
5	Peabody Picture Vocabulary	.375	.000

*Significant at .01 level

Table 9

Stepwise Regression Results with

CTB Math Score as Dependent Variable (N = 81)

Step	Variable	Multiple R	RSQ Change
1	Metropolitan Readiness	.303	.092*
2	Draw-A-Person	.303	.000
3	Slosson IQ	.304	.000
4	Visual Motor Integration	.304	.000
5	Peabody Picture Vocabulary	.305	.001

*Significant at .01 level

Table 10

Stepwise Regression Results with

CTB Total Score as Dependent Variable (N = 81)

Step	Variable	Multiple R	RSQ Change
1	Metropolitan Readiness	.277	.077*
2	Draw-A-Person	.279	.001
3	Slosson IQ	.282	.002
4	Visual Motor Integration	.305	.013
5	Peabody Picture Vocabulary	.306	.001

*Significant at .01 level

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